Pre-Appeal Brief

Claims 12, 16, and 21 stand finally rejected under 35 U.S.C. §103(a) as being obvious over Uehara (US 6,256,125) in view of Graves (US 2002/0064336) or Graves and Strasser (US 2009/0142060).

The claimed invention provides a switching node for a Wavelength Division Multiplex (WDM) optical network that allows a protection path of an optical signal to pass a node, even if a failure in the node blocks the working path of the signal. To that end, the node comprises at least one switching unit and a plurality of optical interfaces to connect to a WDM transmission line. Each optical interface includes a demultiplexer that disassembles incoming multiplexed signals received at an input port of the switching unit, and a multiplexer that assembles output channels from corresponding output ports on the switching unit into a multiplexed signal.

Claim 12 is directed to a node for an optical communication network and recites, "an input branching mechanism connected directly to the at least one receiver, and disposed on the path of the input channels between each optical interface and the switching unit to selectively supply an input channel alternatively to the switching unit or to the receiver."

None of the references, alone or in combination teaches or suggests this limitation. Uehara discloses a node for selective regeneration of channels in a WDM optical transmission system. Figure 4 depicts a node comprising an input demultiplexer 15, an optical switch 16, a bank of 2x2 optical switches 17 to implement the add/drop of WDM channels, an optical regenerative repeater 21, controller 22, and an output multiplexer 18. Uehara discloses not the slightest suggestion of needlessly replicating the add/drop switches 17 at the input; the only such suggestion flows directly from the limitations of claim 12.

The Office freely admits that Uehara fails to teach or suggest such a modification, and that it is not provided by any other reference. "[N]o express teaching or suggestion from Uehara is required for the obviousness of the input-side set of switches." Advisory Action, p. 2, ¶ 2,

line 7. The sole rationale the office provides for its *sua sponte* modification of Uehara is that "any wavelength channels to be dropped at the Uehara fig. 4 node that don't require regeneration . . . would still be forced to undergo inherent insertion loss in the element 16 switch since they would still have to pass through it." Advisory Action, p. 2, ¶ 2, lines 4-6.

Not only does Uehara include not the slightest scintilla of suggestion that (a) the optical switch 16 imposes significant "inherent insertion losses," or (b) that any "inherent insertion losses" in the optical switch 16 poses the slightest problem to reception of dropped optical signals, or (c) that duplication of the add/drop switches 17 (which those of skill in the art know to also have "inherent insertion losses") would not adversely impact the propagation strength of signals not dropped at the node – but in fact Uehara is replete with teachings to the contrary.

Uehara teaches that signals having known bit rates can traverse 80 km between nodes, and that the number of nodes, or "repeats," that each bit rate can sustain is known (*i.e.*, 13 repeats at 600 Mb/s, 6 repeats at 2.4 Gb/s, and only 3 repeats at 10 Gb/s). col. 5, lines 52-55. Hence, in Fig. 1, the signal λ_3, at 10Gb/s, generated at node 38, can be received at node 45 along route 1 (solid line), but not along route 2 (dashed line), since the number of allowable repeats would be exceeded along route 2. col. 5, lines 55-60. Those of skill in the art understand that a network operating specification, such as a maximum number of allowable successive repeat nodes at a given bitrate, means that the signal can be fully recovered by standard equipment at the last allowable node (*i.e.*, it has sufficient signal strength), without concern for "inherent insertion losses" within the standard equipment normally deployed in the nodes. That is, Uehara teaches that if the maximum number of allowable repeat nodes is not exceeded for a given bitrate, the node depicted in Fig. 4 is perfectly adequate to receive any channels to be dropped at that node, using the equipment depicted in Fig. 4, in the configuration shown in Fig. 4.

Uehara's invention concerns the regeneration of signals that are not dropped within the allowable maximum number of repeat nodes for their particular bitrate. These are extracted by the optical switch 16, regenerated at the bit-rate-selective type regenerative repeater 21, and re-inserted into the WDM signal by outputting the regenerated signal to the optical switch 16. "The other wavelength components not to need the regenerative repeating are output as they are." col. 6, lines 29-31. These signals are not attenuated by any "inherent insertion losses" in the optical switch 16 to any degree even worth mentioning in Uehara, much less requiring any amplification or regeneration. Since, by system design and the constraints of system operating parameters, the signals to be dropped at the node of Fig. 4 are within the maximum repeat count for their bitrate, Uehara teaches that they have sufficient signal strength to be detected at the output of the add/drop switches 17.

Furthermore, Uehara teaches that the regenerated signals are routed through the optical switch 16. If this switch's "inherent insertion losses" were significant, Uehara would instead direct the output of the regenerative repeater 21 directly to the bank of add/drop switches 17 to add the regenerated signal to the WDM output, without suffering the "inherent insertion losses" of the optical switch 16. It does not – implying that such losses are either negligible or well within the system design. Basically, Uehara's entire teaching begs the question, "why would the proposed modification be obvious to one of ordinary skill in the art, if Uehara itself teaches, at least by very strong negative implication, that it is not necessary?"

It is beyond question that those of skill in the art appreciate that duplicating an entire bank of optical switches 17-1 to 17-n would increase the cost and complexity of the optical network node, and reduce its reliability by introducing additional points of failure. One of skill in the art would only make such a modification if the "inherent insertion losses" of the optical switch 16 were significant enough to adversely impact the reception of optical signals to be dropped. However, those of skill in the art also realize that the proposed "solution" to this

alleged problem – duplicating the add/drop optical switches 17 at the input to the optical switch 16 – would severely reduce the optical signal power of non-regenerated signals, which Uehara teaches are passed along without modification or amplification. After all, one of skill in the art would readily agree that the notion that only the optical switch 16, and not the optical switches 17, has "inherent insertion losses," is absurd. By adding an entire new layer of "inherent insertion losses" for non-dropped, non-regenerated optical signals, those signals may well fail to meet the specification of the number of repeat nodes they may traverse, at a given bitrate, and maintain sufficient optical signal power.

There are thus two possibilities for one of ordinary skill in the art to consider. One, as Uehara teaches, at least inherently by its structure and reference to system design parameters, is that any "inherent insertion losses" of the optical switch 16 are negligible or well within system design parameters, in which case the Office's proffered rationale for its *sua sponte* modification to Uehara fails to support a *prima facie* case of obviousness. The other possibility is that the "inherent insertion losses" of the optical switch 16 are significant enough to make the proposed modification of Uehara's design obvious (in which case we must assume the Uehara designers were simply deficient) – however, in this case, the Office's proposed modification would add another layer of "inherent insertion losses" to the non-dropped, non-regenerated signals, possibly violating the system specification of the allowable number of repeat nodes for a given bitrate. No one of skill in the art would adopt such a "solution" – effectively degrading performance in the general case (traversing signals) to optimize performance in the relatively rare case (dropped signals). Accordingly, this possibility also fails to support a *prima facie* case that the proposed modification would be obvious.

In short, either the "problem" the Office asserts does not exist (*i.e.*, the switch 16 "inherent insertion losses" do not adversely affect reception) or, if it does exist, the Office's proposed "solution" would not be adopted by those of skill in the art due to its deleterious effect

on non-dropped, non-regenerated signals. In either case, the rationale does not support the obviousness of the proffered modification.

For at least the reason that the Office's rationale offered in support of its modification of Uehara – without any teaching or suggestion whatsoever in the prior art as to either the proposed modification or the rationale supporting it – fails to establish a *prima facie* case of obviousness, the § 103 rejections of claims 12, 16, and 21 are improper and must be overturned. Graves and Strasser fail to cure the deficiency of Uehara or the Office's rationale to teach or suggest the proposed modification. All dependent claims include the limitations of their respective parent claim(s), and hence also exhibit patentable nonobviousness over the art of record.

In light of the foregoing remarks, Applicants respectfully request reversal of the finality of the Office Action, and that the Office issue a Notice of Allowance for all pending claims.

Respectfully submitted,
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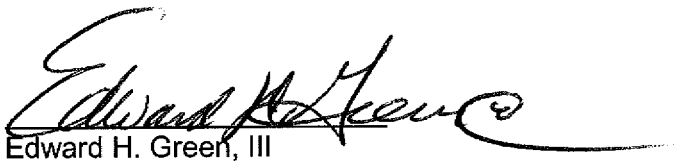

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